

Supplementary Material

Title: ¹⁸F-FDG PET/MR versus MR alone in whole-body primary staging and restaging of patients with rectal cancer: what is the benefit of PET?

1. Technical parameters of PET/MR protocols

PET acquisition time per bed-position took 2 minutes and 4 bed-positions were needed to cover from skull basis to proximal femur. PET images were reconstructed using a three-dimensional Ordinary Poisson Ordered Subset Expectation Maximization algorithm (3D OP-OSEM; 3 iterations, 21 subsets, voxel size 2.1 x 2.1 x 2.0 mm³, 3D Gaussian filter of 4.0 mm).

Table 1. Detailed rectal, liver and whole body MR protocols.

MR sequences	Plane	Matrix sizes	Slice thickness (mm)	Gap	Field of view (mm)	
Rectal protocol of pelvis	T2w TSE (a)	sagittal	310 x 320	4	10%	200
	T2w TSE	coronal	310 x 320	3	0	200
	T2w TSE	axial	310 x 320	3	0	160
	EPI DWI (b)	axial	102 x 160	3	0	260
Liver protocol	T1w_3D VIBE (c)	axial	512 x 230	3.5	0	400
	T1w with in and out of phases (d)	axial	256 x 256	7	20%	380
Whole body protocol from skull basis to proximal femur	T2 HASTE (e)	axial	320 x 194	7	20%	400
	T1_3D VIBE (f)	axial	320 x 165	3	0	380
	DWI (g)	axial	160x90	5mm	20%	420

- a) T2-weighted Turbo spine echo (TSE) without fat suppression.
- b) Diffusion weighted echo planar sequence (EPI DWI, B-values: 0, 500 and 1000 s/mm²).
- c) Dynamic contrast-enhanced 3D T1-weighted Volumetric Interpolated Breath Hold Examination (VIBE) with fat-suppression and repetitive scans before and after i.v. injection of 0.2 ml gadoterate meglumine (Dotarem®, Guerbet, France) per kilogram bodyweight (arterial phase with 20sec delay, portalvenous with 50sec delay and venous phase with 80sec delay).
- d) T1-weighted gradient echo sequence in phase and out of phase.
- e) T2-weighted (T2w) half-Fourier acquisition single-shot turbo spin echo (HASTE)
- f) Contrast-enhanced 3D T1-weighted Volumetric Interpolated Breath Hold Examination (VIBE) with fat-suppression.
- g) Diffusion weighted echo planar sequence (EPI DWI, B-values: 0, 500 and 1000 s/mm²).

2. Measurement of SUVmax in tumor and liver

As metabolic parameter, maximum of standard uptake value (SUVmax) of rectal tumor was measured by drawing a spherical volume of interest in the most FDG-avid region of PET. SUVmax of the liver was determined in the same way by placing a larger volume of interest in the right lobe. SUVmax_Ratio was calculated as the ratio of SUVmax of rectal tumor relative to the liver. All measurements were performed in a consensus meeting of two readers and one nuclear physician with dedicated post-processing software (Syngo.via, VB30B, Siemens Healthcare, Erlangen, Germany).